

What is claimed is:

1. A method of forming a transistor of a semiconductor device comprising:  
forming an N type gate pattern and a P type gate pattern on an N type  
transistor area and a P type transistor area, respectively, of a semiconductor  
substrate;

selectively implanting N type impurities into the N type transistor area;

forming an insulation layer on the substrate including the N type gate pattern  
and the P type gate pattern;

forming a first spacer on sidewalls of the P type gate pattern by anisotropically  
etching a portion of the insulation layer in the P type transistor area while a portion of  
the insulation layer remains in the N type transistor area; and

selectively implanting P type impurities into the P type gate pattern including  
the first spacer and into the P type transistor area.

2. The method of claim 1, wherein the N type gate pattern and the P type  
gate pattern include a gate oxide layer pattern and an undoped polysilicon layer  
pattern.

3. The method of claim 1, further comprising forming an oxide layer on the  
substrate including the N type gate pattern and the P type gate pattern to repair  
damage to the substrate and the gate patterns after forming the N type gate pattern

and the P type gate pattern.

4. The method of claim 1, wherein implanting the N type impurities comprises:

5 forming a photoresist pattern on the substrate to selectively expose the N type transistor area;

forming an N type impurity region having a low impurity concentration and an N type conductive gate pattern by implanting the N type impurities into the N type gate pattern and into the N type transistor area using the photoresist pattern as a mask;

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removing the photoresist pattern.

5. The method of claim 1, wherein the N type impurities include arsenic (As).

15 6. The method of claim 1, wherein the insulation layer includes silicon nitride.

7. The method of claim 1, wherein the insulation layer is formed at a  
20 temperature of about 700 to about 800°C.

8. The method of claim 1, wherein the insulation layer has a thickness of

about 160 to about 240Å.

9. The method of claim 1, wherein forming the first spacer comprises:

forming a photoresist pattern on the substrate to selectively expose the P type transistor area, wherein forming the first spacer on the sidewall of the P type gate pattern by anisotropically etching the portion of the insulation layer in the P type transistor area includes using the photoresist pattern as an etching mask.

10. The method of claim 9, wherein implanting the P type impurities comprises:

forming a P type impurity region having a low impurity concentration and a P type conductive gate pattern by implanting the P type impurities into the P type gate pattern and into the P type transistor area using the photoresist pattern as a mask; and

removing the second photoresist pattern.

11. The method of claim 1, wherein the P type impurities include boron (B).

12. The method of claim 1, wherein after implanting the P type impurities, further comprises:

selectively removing the portion of the insulation layer in the N type transistor region and selectively removing the first spacer on the P type transistor region;

forming second spacers on sidewalls of the N type gate pattern and the P type gate pattern;

selectively implanting N type impurities into the N type gate pattern and into the N type transistor area; and

5       selectively implanting P type impurities into the P type gate pattern and into the P type transistor area.

13.     The method of claim 12, wherein the insulation layer and the first spacer are selectively removed by a wet etching process.

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14.     The method of claim 13, wherein the insulation layer and the first spacer are removed using an etching solution including phosphoric acid ( $\text{H}_3\text{PO}_4$ ).

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15.     The method of claim 12, wherein the N type impurities include phosphorus (P) or arsenic (As).

16.     A method of forming a transistor of a semiconductor device comprising:  
forming an N type gate pattern and a P type gate pattern on an N type transistor area and a P type transistor area, respectively, of a semiconductor substrate,  
20       wherein each of the gate patterns includes a gate oxide layer pattern and an undoped polysilicon layer pattern;

forming a thermal oxidized layer on the substrate including the gate patterns to

repair damage to the substrate and the gate patterns;

selectively implanting N type impurities into the N type gate patterns and into a portion of the substrate adjacent to the N type gate pattern to change the undoped polysilicon layer pattern into a conductive polysilicon layer and to form an N type impurity region having a low impurity concentration adjacent to the N type gate pattern;

forming an insulation layer on the substrate including the gate patterns;

forming a first spacer on sidewalls of the P type gate pattern by anisotropically etching a portion of the insulation layer in the P type transistor area while a portion of the insulation layer remains in the N type transistor area; and

selectively implanting P type impurities into the P type gate pattern and a portion of the substrate adjacent to the P type gate pattern to change the undoped polysilicon layer pattern into a conductive polysilicon layer pattern and to form a P type impurity region having a low impurity concentration adjacent to the P type gate pattern.

17. The method of claim 16, wherein the insulation layer includes silicon nitride.

18. The method of claim 16, wherein the insulation layer has a thickness of about 160 to about 240Å.

19. The method of claim 16, wherein forming the first spacer comprises:

forming a photoresist pattern on the substrate to selectively expose the P type transistor area, wherein forming the first spacer on the sidewalls of the P type gate pattern by anisotropically etching the portion of the insulation layer in the P type transistor area includes using the photoresist pattern as an etching mask.

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20. The method of claim 19, wherein selectively implanting the P type impurities comprises:

using the photoresist pattern as a mask; and  
removing the photoresist pattern.

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21. The method of claim 16, after forming the first spacer, further comprising:

selectively removing the portion of the insulation layer in the N type transistor area and a portion of the first spacer in the P type transistor area;

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forming second spacers on sidewalls of the gate patterns;

selectively implanting N type impurities into the N type gate pattern and into the portion of the substrate adjacent to the N type gate pattern including the second spacers to form an N type impurity region having a high impurity concentration adjacent to the N type impurity region having the low impurity concentration; and

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selectively implanting P type impurities into the P type gate pattern and into the portion of the substrate adjacent to the P type gate pattern having the second spacers to form a P type impurity region having a high impurity concentration adjacent

to the P type impurity region having the low impurity concentration.